4. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein:

B1 cont'd

the mold used in the resin sealing step comprises an upper mold which can be elevated, and a lower mold having a first lower mold half body which is kept stationary and a second lower mold half body which can be elevated with respect to the first lower mold half body; and

the resin sealing step comprises:

a substrate loading step of placing the substrate on which the semiconductor elements having the protruding electrodes are arranged in a cavity defined by a cooperation of the first and second lower mold half bodies and providing the sealing resin in the cavity;

a resin layer forming step of moving down the upper mold and the second lower mold half body so that the sealing resin is heated, melted and compressed so that the resin layer sealing the protruding electrodes is formed; and

a detaching step of moving up the first mold so as to detach the upper mold from the resin layer, and then moving down the second lower mold half body from the first lower mold half body so that the substrate to which the resin layer is provided is detached from the mold.

5. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein:

an excess resin removing mechanism is provided in the mold used in the resin sealing step; and

the excess resin removing mechanism removes excess resin and controls a pressure

applied to the sealing resin in the mold.

B1 cancld

6. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim [1 or 2] 3, [characterized in that] wherein the resin sealing step uses a sheet-shaped resin as the sealing resin.

7. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim [1or 2] 3, [characterized in that] wherein the sealing resin is provided to the film before the resin sealing step is executed.

8. (Amended) The method for fabricating the semiconductor device as claimed in claim 7, [characterized in that] wherein a plurality of sealing resins are provided to the film, and the resin sealing step is continuously carried out [while the film is moved] by moving of the film.

9. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein a reinforcement plate is loaded onto the mold before the substrate is loaded onto the mold in the resin sealing step.

Claim 10, line 3, change "characterized in that" to --wherein--.

B2 cont'd

11. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein the protruding electrode exposing step uses means for exposing the ends thereof from the resin layer, said means being at least one of a

laser beam projection, eximer laser, etching, mechanical polishing, and blasting.

B2 cancld

12. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim [1 or 2] 3, [characterized in that] wherein:

the film used in the resin sealing step is formed of an elastically deformable substance, and the ends of the protruding electrodes are caused to fall in the film when the resin layer is formed by using the mold; and

the film is detached from the resin layer in the protruding electrode exposing step so that the ends of the protruding electrodes can be exposed from the resin layer.

Claim 13, line 2, delete "characterized by".

Claim 14, line 3, change "characterized in that there is provided" to --further comprising--;

line 4, delete "is".

Claim 15, line 2, delete "or 14";

line 3, change "characterized in that there is provided" to --further comprising--.

Claim 16, line 3, change "characterized in that" to --wherein--.

B3 cntd

17. (Twice Amended) The mold for fabricating the semiconductor device as claimed in claim 13, [characterized in that] wherein an area enclosed by the second lower mold

half body is wider than an area of an upper portion of the first lower mold half body in a state in which the cavity is formed.

B3 amd

18. (Amended) A semiconductor device [characterized by] comprising:

a semiconductor element having a surface on which protruding electrodes are [directly] formed; and

a resin layer which is formed on the surface of the semiconductor element and seals at least a lateral surface of the protruding electrodes [except for ends thereof].

Claim 19, line 2, change "characterized in that there is provided" to --further comprising--.

B4

20. (Twice Amended) The method for fabricating the semiconductor device as claimed in [any of] claim 1 [or 2], [characterized in that] wherein the sealing resin used in the resin sealing step comprises a plurality of sealing resins having different characteristics.

21. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 9, [characterized in that there is provided] further comprising a reinforcement plate to which the sealing resin is provided beforehand in the resin sealing step.

Claim 22, line 3, change "characterized in that" to --wherein--.

B5 cont'd

23. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein a second resin layer is formed so as to cover a back surface of the substrate after or at the same time as the first, resin layer is formed, in the resin sealing step, on the surface of the substrate on which the protruding electrodes are arranged.

24. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 3, [characterized in that] wherein:

the film used in the resin sealing step has projections located in positions corresponding to those of the protruding electrodes; and

the resin layer is formed in a state in which the projections are pressed against the protruding electrodes.

25. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein:

an external connection protruding electrode forming step is executed which forms external connection protruding electrodes on the ends of the protruding electrodes after the ends of the protruding electrodes are exposed from the resin layer in the protruding electrode exposing step.

26. (Amended) The method for fabricating the semiconductor device as claimed in claim 25, [characterized in that] wherein the protruding electrodes and the external connection protruding electrodes are bonded by using a bonding member having a characteristic of stress

relaxation in the external connection protruding electrode forming step.

B5 cont'd

27. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein:

cutting position grooves are formed, before the resin sealing step is carried out, in the substrate so as to be located in positions in which the substrate is cut in the separating step; and

the substrate is cut in the cutting position grooves filled with the sealing resin.

28. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 1 [or 2], [characterized in that] wherein:

a pair of stress relaxing grooves is formed, prior to the resin sealing step, so as to sandwich a position in which the substrate is to be cut; and

the substrate is cut in the position interposed between the pair of stress relaxing grooves in the separating step.

Claim 29, line 2, delete "characterized by".

Claim 30, line 2, delete "characterized by".

Claim 31, line 3, change "characterized in that" to --wherein--;

line 4, change "owned" to --included--.

B6 cont'd

32. (Twice Amended) The method for fabricating the semiconductor device as claimed in [any of claims 1, 2, 29, 30 or 31] claim 1 or 30, [characterized in that] wherein

B6 cancel

positioning grooves are formed on a back surface of the resin layer [or] of the substrate after the resin sealing step is executed and before the separating step is executed.

Claim 33, line 3, change "characterized in that" to --wherein--.

34. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 3, [characterized in that] wherein:

the film used in the resin sealing step has projection or recess portions located in positions in which the film is not interfered with the projecting electrodes; and

recess or projection portions formed on the resin layer by the projection or recess portions are used for positioning after the resin sealing step is completed.

35. (Twice Amended) The method for fabricating the semiconductor device as claimed in [any of claims 1, 2 or 29] claim 1, [characterized in that] wherein the sealing resin is processed in positions in which positioning protruding electrodes are formed in order to discriminate the protruding electrodes and the positioning protruding electrodes from each other.

B7

36. (Amended) A semiconductor device [characterized by] comprising:

a semiconductor element having a surface on which external connection electrodes are provided which are to be electrically connected to external terminals; and

a resin layer provided on the surface of the semiconductor element so as to cover the external connection electrodes,

wherein the external connection electrodes are[laterally] exposed at a

lateral surface of [an interface between the semiconductor element and] the resin layer.

B7 cont'd

37. (Amended) [The] A method for mounting [the] a semiconductor device [as claimed in claim 36], comprising mounting the semiconductor device [characterized in that the semiconductor device is mounted] on a mounting board so as to vertically stand thereon, the semiconductor device comprising:

a semiconductor element having a surface on which external connection electrodes are provided which are to be electrically connected to external terminals; and

a resin layer provided on the surface of the semiconductor element so as to cover the external connection electrodes,

wherein the external connection electrodes are exposed at a lateral surface of the resin layer.

Claim 38, line 3, change "characterized in that" to --wherein--.

Claim 39, line 3, change "characterized in that" to --wherein--.

B8 cont'd

40. (Amended) The method for mounting the semiconductor device as claimed in [any of claim 18, 19 and 36] claim 18 or 36, [characterized in that] wherein the semiconductor device [is mounted on a mounting board through] has an interposer having an outer connection means, and wherein an interval between the outer connection means is wider than an interval between the protruding electrodes.

41. (Amended) The semiconductor device as claimed in claim 18 [or 17], [characterized in that] wherein the resin layer comprises a plurality of resin layers having different characteristics.

B8 cancel

Claim 42, line 1, delete "characterized by".

Claim 43, line 1, delete "characterized by".

Claim 45, line 3, change "characterized in that" to --wherein--.

Claim 46, line 2, delete "or 45";

line 3, change "characterized in that" to --wherein--.

Claim 47, line 2, delete "or 45";

line 3, change "characterized in that" to --wherein--.

Claim 48, line 3, change "characterized in that" to --wherein--.

B9 cancel

49. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 44 [or 45], [characterized in that there is provided] wherein an excess resin removing mechanism is provided in the mold used in the resin sealing step,

wherein the excess resin removing mechanism removes excess resin and controls a pressure applied to the sealing resin in the mold.

50. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 44 [or 45], [characterized in that] wherein:

extending portions are formed to the wiring board so that the extending portions laterally extend from a position in which the semiconductor element is placed; and

a bending step of bending the extending portions is executed after the resin sealing step is completed and before the protruding electrode forming step is executed.

B9 cancel

51. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 44 [or 45], [characterized in that] wherein:

extending portions are formed to the wiring board so that the extending portions laterally extend from a position in which the semiconductor element is placed;

a bending step of bending the extending portions is carried out before the resin sealing step is executed; and

the resin sealing step and the protruding electrode forming step are carried out after the bending step is executed.

52. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 50 [or 51], [characterized in that] wherein:

connection electrodes to be connected to the semiconductor element are formed to ends of the extending portions; and

an element connecting step of connecting the semiconductor element and the connection electrodes is executed after the bending step is carried out.

Claim 53, line 3, change "characterized in that" to --wherein--.

Claim 54, line 1, delete "characterized by";

line 12, before "there", insert --wherein--.

Claim 55, line 2, change "characterized in that there is provided" to --further comprising--;

line 3, after "and", insert --which--.

Claim 56, line 2, delete "or 55" and change "characterized in that" to --wherein--.

Claim 57, line 1, delete "characterized by".

Claim 58, line 2, change "characterized in that" to --wherein--.

Claim 59, line 2, delete "or 58" and change "characterized in that" to --wherein--.

Claim 60, line 2, delete "or 58" and change "characterized in that" to --wherein--;

line 3, delete "are" (both occurrences).

Claim 61, line 2, change "characterized in that" to --wherein--.

Claim 62, line 2, change "characterized in that" to --wherein--.

63. (Twice Amended) The semiconductor device as claimed in claim 57 [or 58], [characterized in that] wherein the semiconductor element or elements are partially exposed from the sealing resin.

64. (Twice Amended) The semiconductor device as claimed in claim 57 [or 58], [characterized in that there is provided] further comprising a heat radiating member in a position close to the semiconductor element or elements.

Claim 65, line 2, delete "characterized by".

Claim 66, line 3, change "characterized in that" to --wherein--.

Claim 67, line 2, delete "or 66";

line 3, change "characterized in that" to --wherein--.

68. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 65 [or 66], [characterized in that] wherein:

a chip attachment step of positioning the semiconductor elements on the heat radiating member and attaching the semiconductor elements thereto before the chip mounting step is executed; and

the semiconductor elements attached to the heat radiating member are mounted to the electrode plate in the chip mounting step.

69. (Twice Amended) The method for fabricating the semiconductor device as claimed in claim 65 [or 68], [characterized in that] wherein:

protruding terminals protruding from the electrode plate are formed in the electrode plate forming step; and

the sealing resin is formed, in the sealing resin forming step, so as to expose the protruding terminals from the sealing resin.

70. (Twice Amended) [An] A mounting arrangement for mounting [the] a semiconductor device [as claimed in claim 57 or 58] on a mounting board, [characterized by] the semiconductor device comprising:

a single or a plurality of semiconductor elements;

a sealing resin which seals partially or totally the semiconductor element or

elements; and

an electrode plate which is provided in the sealing resin and is electrically connected to the semiconductor element or elements, the electrode plate having portions which are exposed from side surfaces of the sealing resin and function as external connection electrodes;

the mounting arrangement comprising:

a socket having an attachment portion to which the semiconductor device is attached, and lead parts provided so as to be connected to the external connection terminals exposed from the sealing resin,

the semiconductor device being attached to the socket, and the lead parts and the external connection terminals being connected, the lead parts being connected to the mounting board.

71. (Twice Amended) A mounting arrangement for mounting [the] a semiconductor device [as claimed in claim 60] on a mounting board, [characterized by] the semiconductor device comprising:

a single or a plurality of semiconductor elements;

a sealing resin which seals partially or totally the semiconductor element or elements;

an electrode plate which is provided in the sealing resin and is electrically connected to the semiconductor element or elements, the electrode plate having portions which are exposed from side surfaces of the sealing resin and function as external connection electrodes; and

protruding terminals provided to the electrode plate, and exposed from a bottom surface of the sealing resin, so that protruding terminals function as external connection terminals;

the mounting arrangement comprising:

bumps arranged to the protruding terminals for forming the external connection terminals,

the semiconductor device being connected to the mounting board through the bumps.

B11 Contd

72. (Twice Amended) A mounting arrangement for mounting [the] a semiconductor device [as claimed in claim 59] on a mounting board, [characterized by] the semiconductor device comprising:

a single or a plurality of semiconductor elements;

a sealing resin which seals partially or totally the semiconductor element or elements; and

an electrode plate which is provided in the sealing resin and is electrically connected to the semiconductor element or elements, the electrode plate having portions which are exposed from side surfaces of the sealing resin and function as external connection electrodes;

wherein the electrode plate is exposed from a bottom surface of the sealing resin in addition to the side surfaces thereof, so that portions of the electrode plates exposed from the bottom surface function as external connection terminals;

the mounting arrangement comprising:

a mounting member including connection pins that are flexibly deformable and are located in positions corresponding to those of the external connection terminals, and a positioning member positioning the connection pins,

upper ends of the connection pins being connected to the external connection terminals of the semiconductor device, and lower ends thereof being connected to the mounting board.

B11 Could

Claim 73, line 1, delete "characterized by".

Claim 74, line 2, change "characterized in that" to --wherein--.

Claim 75, line 2, change "characterized in that" to --wherein--.

76. (Amended) The semiconductor device as claimed in [any of claims 73 to 75] claim 73, [characterized in that there is provided] further comprising an insulating member which is provided on the interposer and has holes located in positions facing the protruding electrodes.

B12

77. (Twice Amended)The semiconductor device as claimed in [any of claims 73 to 75] claim 73, [characterized in that] wherein the interposer comprises a TAB (Tape Automated) Bonding) tape.

Claim 78, line 2, delete "characterized by".

Claim 80, line 2, change "characterized in that" to --wherein--

Claim 81, line 2, change "characterized in that" to --wherein--.

Claim 82, line 2, change "characterized in that" to --wherein--.

Claim 83 line 2, change "characterized in that" to --wherein--.

Claim 84, line 2, change "characterized in that" to --wherein--.

Claim 85, line 2, change "characterized in that" to --wherein--.

Claim 86, line 2, delete "characterized by".

Please add new claims 87-102 as follows:

--87. A semiconductor wafer on which semiconductor elements are provided, comprising:

a semiconductor wafer including a plurality of semiconductor elements having a surface on which protruding electrodes are formed; and

a compressed resin layer which is formed on the surface of the semiconductor elements and seals at least a lateral surface of the protruding electrodes.

88. A semiconductor device comprising:

a semiconductor element having a surface on which protruding electrodes are formed; and

a compressed resin layer which is formed on the surface on the semiconductor element and seals at least a lateral surface of the protruding electrodes,

wherein a lateral surface of the resin layer and a lateral surface of the semiconductor element have planes cut by a dicer.

89. A semiconductor device as claimed in claim 88, wherein the lateral surface of the resin layer and the lateral surface of the semiconductor element have a common plane.

90. A semiconductor device comprising:

a semiconductor element having a surface on which connection electrodes are provided, which are to be electrically connected to external terminals; and

a resin layer provided on the surface of the semiconductor elements so as to cover the external connection electrodes,

wherein the external connection electrodes are exposed at a lateral surface of the resin layer, the lateral surface of the resin layer and the lateral surface of the semiconductor element have planes cut by a dicer.

91. A semiconductor device comprising:

a semiconductor element having a surface on which protruding electrodes are formed; and

a resin layer which is formed on the surface on the semiconductor element and seals a lateral surface and a top of the protruding electrodes,

wherein the lateral surface of the resin layer and the lateral surface of the semiconductor element have planes cut by a dicer.

92. A method for fabricating the semiconductor as claimed in claim 1, wherein the resin sealing step disposes a film between the substrate and the mold.

93. A method for fabricating the semiconductor as claimed in claim 4, wherein the resin sealing step further comprises a film disposing step of providing a non-adhesive process film

between contact surfaces of the upper mold and the first lower mold half body and the second mold half body.

94. A method for fabricating a semiconductor device, comprising the steps of:

an encapsulating step of supplying a rigid sealing material to a substrate on which protruding electrodes are formed so as to form an encapsulation layer which seals the protruding electrodes and the substrate;

a stiffening step of heating the encapsulation layer;

a protruding electrode exposing step of exposing at least ends of the protruding electrodes from the resin layer; and

a separating step of cutting the substrate together with the resin layer so that the semiconductor elements are separated from each other.

95. A semiconductor device comprising:

a plurality of electrode pads provided on a semiconductor substrate;

a plurality of protruding electrodes formed on the substrate, spaced apart from the electrode pads,

a lead line connecting selectively between the electrode pads and the protruding electrodes; and

a resin layer which is formed on the surface on the substrate and seals the electrode pads, the lead line and at least a lateral surface of the protruding electrodes,

wherein a lateral surface of the resin layer and a lateral surface of the substrate are

cut by a dicer.

96. The semiconductor device as claimed in claim 95, wherein the protruding electrodes are arranged at an increased pitch than a pitch of the pads.--

B11 cont'd

97. The semiconductor device as claimed in claim 88, wherein the resin sealing step disposes a film between the protruding electrodes and the mold, which thus contacts the sealing resin through the film.

98. The semiconductor device as claimed in claim 88, wherein the resin sealing step uses a sheet-shaped resin as the sealing resin.

99. The semiconductor device as claimed in claim 88, wherein a reinforcement plate is loaded onto the mold before the substrate is loaded onto the mold in the resin sealing step.

100. The semiconductor device as claimed in claim 88, wherein:

the film used in the resin sealing step is formed of an elastically deformable substance, and the ends of the protruding electrodes are caused to fall in the film when the resin layer is formed by using the mold; and

the film is detached from the resin layer in the protruding electrode exposing step so that the ends of the protruding electrodes can be exposed from the resin layer.

101. The semiconductor device as claimed in claim 88, further comprising a heat radiating member provided on a back surface of the semiconductor element opposite to the surface thereof on which the protruding electrodes are provided.

B13 Cancel

102. The semiconductor device as claimed in claim 88, wherein the sealing resin used in the resin sealing step comprises a plurality of sealing resins having different characteristics.--

REMARKS

The above amendments are made to place the application in better condition for examination. Prompt and favorable action is earnestly solicited.

In the event that this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees which may be due with respect to this paper, may be charged to Deposit Account No. 01-2340.

Respectfully submitted,

ARMSTRONG, WESTERMAN, HATTORI,
McLELAND & NAUGHTON

Stephen G. Adrian
Attorney for Applicants
Reg. No. 32,878

Attachment: Amendment Transmittal Letter

Atty. Docket No. 980233
1725 K Street, N.W., Suite 1000
Washington, D.C. 20006
Tel.: 202-659-2930
Fax.: 202-887-0357
SGA/rlr